CLAIMS

1. A gene which encodes a protein capable of regenerating luciferin by acting on oxyluciferin and D-cysteine.

2. The gene of claim 1 which is derived from an organism capable of luminescence.

3. The gene of claim 2 wherein the organism capable of luminescence is a Coleoptera.

4. The gene of claim 2 wherein the organism capable of luminescence is a firefly.

5. The gene of claim 2 wherein the organism capable of luminescence is a North American firefly.

6. The gene of claim 2 wherein the organism capable of luminescence is an American firefly.

7. A gene which encodes the following protein (a) or (b):

(a) a protein which comprises an amino acid sequence represented by SEQ ID NO: 2;

(b) a protein which comprises an amino acid sequence derived from the amino acid sequence (a) by deletion, substitution, or addition of one or more amino acids, and is capable of regenerating luciferin.

8. A gene which has a 50% or more homology with the amino acid sequence represented by SEQ ID NO: 2 and encodes a protein capable of regenerating luciferin.

9. A novel recombinant DNA which is characterized in that the gene of claims 1 to 8 encoding a protein capable of regenerating luciferin is inserted into a vector DNA.

10. A transformant or a transductant which comprises the

recombinant DNA of claim 9.

11. A method of producing a protein capable of regenerating luciferin which comprises culturing the transformant or transductant of claim 10 in a medium and collecting the protein capable of regenerating luciferin from the culture product.